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EXAMINER

SINGH, RAMNANDAN P

ART UNIT

PAPER NUMBER

2614

MAIL DATE

DELIVERY MODE

06/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/072,833

Applicant(s)

NORRELL ET AL.

Examiner

Ramnandan Singh

Art Unit

2614

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 31-43 is/are allowed.
- 6) ☒ Claim(s) 1-10, 18-26 and 44-49 is/are rejected.
- 7) ☒ Claim(s) 11-17 and 27-30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Reopening of Prosecution After Appeal

1. Examiner considered the appeal brief filed on March 19, 2007.

Examiner performed updated search and new prior art references were found. Although Examiner did not agree with the Applicant's arguments stated in the Appeal brief and kept the rejections in the Final office action, Examiner made new grounds of rejection in light of the newly discovered prior art.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing at the end.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 18 is rejected under 35 U.S.C. 102(e) as being anticipated by Hinman et al [US 6,977,958 B1].

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference

was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 18, Hinman et al disclose a method for improving transmission of DSL signals over a local loop, comprising the steps of:

configuring a loop extender shown in Fig. 3 with

a plurality of upstream complex impedances coupled in parallel [Fig. 13];

a plurality of downstream complex impedances coupled in parallel [Fig. 14];

a plurality of upstream filter and amplifying elements coupled in parallel [Fig. 22] and coupled in series with the plurality of upstream complex impedances [Fig. 3]; and

a plurality of downstream filter and amplifying elements coupled in parallel [Fig. 24] and coupled in series with the plurality of downstream complex impedances [Fig.3].

4. Claims 44, 45 are rejected under 35 U.S.C. 102(e) as being anticipated by Shenoi et al [US 6,507,606 B2].

Regarding claim 44, Shenoi et al teach a method for improving transmission of DSL signals over a local loop shown in Fig. 2, comprising the steps of:

transmitting control signals and DSL signals over the local loop [Fig. 2; col. 6, lines 35-53];

providing DSL signal amplification via selectable line termination and equalization (SLTE) DSL amplification circuitry coupled to the local loop [Fig. 2; col. 6, lines 54-60];

receiving the control signals via a diagnostic and control unit (DCU) coupled to the local loop [Fig. 2; col. 6, lines 53-67];

processing the control signals [Fig. 2; col. 6, lines 61-63];

selecting SLTE DSL amplification circuitry switch states in accordance with the processed control signals [Fig. 2; col. 6, lines 63-67];

sampling DSL signals within the SLTE DSL amplification circuitry [Fig. 2; col. 2, line 66 to col. 3, line 30; col. 6, lines 35-45];

processing the sampled DSL signals [Fig. 2; col. 6, lines 35-45];

selecting SLTE DSL amplification circuitry switch states in accordance with the processed sampled DSL signals to improve SLTE DSL

amplification circuitry performance [Fig. 2; col. 2, line 66 to col. 3, line 30; col. 9, line 55 to col. 10, line 67]; and

uncoupling SLTE DSL amplification circuitry from the local loop in accordance with the processed control signals [Fig. 2; col. 2, line 66 to col. 3, line 30] .

Claim 45 is essentially similar to claim 44 and is rejected for the reasons stated above.

5. Claims 18-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Mukherjee [US 6,226,322 B1].

Regarding claim 18, Mukherjee teaches a method for improving transmission of DSL signals over a local loop shown in Figs. 1-4 [col. 10, lines 41-63], comprising the steps of:

configuring a loop extender [col. 2, lines 10-28] with:

a plurality of upstream complex impedances comprising elements, capacitor C89, resistors R1X, R11, R12 and R13 wherein selecting a combination of switches S12', S23' and S3X' yields a plurality of complex

impedances coupled in parallel [Figs. 1, 4, 8; col. 18, line 13 to col. 19, line 37; col. 17, line 18 to col. 18, line 12];

a plurality of downstream complex impedances comprising resistor R_{i1} , a variable resistor R_{s1} and capacitor C_{s1} wherein selecting different values of R_{f1} yields a plurality of complex impedances coupled in parallel [Figs. 1, 10, 13; col. 26, line 59 to col. 28, line 15];

a plurality of upstream amplifying elements comprising amplifier 90, resistors R_1 , R_2 , R_3 , R_X wherein selecting a combination of switches S_{12} , S_{23} , S_{3X} yields a plurality of amplifying elements coupled in parallel and coupled in series with the plurality of upstream complex impedances [Figs. 1, 4, 8; col. 18, line 13 to col. 19, line 37]; and

a plurality of downstream amplifying elements comprising amplifier (111), capacitor C_{f1} and a variable resistor R_{f1} wherein selecting different values of the variable resistor R_{f1} yields a plurality of amplifying elements coupled in parallel and coupled in series with the plurality of downstream complex impedances [Figs. 10, 13; col. 26, line 59 to col. 28, line 15]. For example, Sheno et al [US 6,507,606 B2] shows that the digital subscriber loop (DSL) repeaters may be integrated into the system with which they are associated [col. 19, lines 7-10].

Regarding claims 19-25, the limitations are shown above.

6. Claims 1-9 and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukherjee [US 6,226,322 B1].

Regarding claim 1, Mukherjee further teaches a system for improving transmission of DSL signals over a local loop, the system comprising:

a loop extender capacitively coupled to the local loop using capacitor C89 [Fig. 8];

a plurality of upstream complex impedances comprising elements, capacitor C89, resistors R_{IX}, R_{I1}, R_{I2} and R_{I3} wherein selecting a combination of switches S₁₂' , S₂₃' and S_{3X}' yields a plurality of complex impedances coupled in parallel [Figs. 1, 4, 8; col. 18, line 13 to col. 19, line 37];

a plurality of downstream complex impedances comprising resistor R_{i1}, a variable resistor R_{s1} and capacitor C_{s1} wherein selecting different values of R_{f1} yields a plurality of complex impedances coupled in parallel [Figs. 1, 10, 13; col. 26, line 59 to col. 28, line 15];

a plurality of upstream amplifying elements comprising amplifier 90, resistors R1, R2, R3, RX wherein selecting a combination of switches S12, S23, S3X yields a plurality of amplifying elements coupled in parallel and coupled in series with the plurality of upstream complex impedances [Figs. 1, 4, 8; col. 18, line 13 to col. 19, line 37]; and

a plurality of downstream amplifying elements comprising amplifier (111), capacitor Cf1 and a variable resistor Rf1 wherein selecting different values of the variable resistor Rf1 yields a plurality of amplifying elements coupled in parallel and coupled in series with the plurality of downstream complex impedances [Figs. 10, 13; col. 26, line 59 to col. 28, line 15].

Although Mukherjee teaches coupling a first upstream amplifying element (54C) in series with the plurality of upstream complex impedances (56) [Figs. 1, 4, 8], he does not teach expressly using a first switch to connect the first upstream amplifying element to the plurality of upstream complex impedances.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a switch, called a first switch, in order to

selectively connect the first upstream amplifying element to the plurality of upstream complex impedances to facilitate the selection of impedances. Similarly, a second switch is applied to select one of the downstream impedances .

Regarding claims 2-6, the limitations are shown above.

Regarding claim 7-9, although Mukherjee does not teach expressly using fourth and fifth switches, it would have been obvious to a person of ordinary skill in the art, at the time of the invention, to use a switch, called a third switch, in order to select one of the upstream amplifying elements to facilitate the selection of amplifying elements to provide upstream DSL signal amplification. Similarly, a fourth switch is applied to select one of the downstream amplifying elements.

Regarding claim 44, Mukherjee teaches a method for improving transmission of DSL signals over a local loop, comprising the steps of:

transmitting control signals and DSL signals over the local loop [Fig. 1; col. 3, line 61 to col. 4, line 12; col. 5, line 12 to col. 6, line 9; col. 8, lines 18-65];

providing DSL signal amplification via selectable line termination and equalization

(SLTE) DSL amplification circuitry coupled to the local loop [Figs. 2-7; col. 23, line 18 to col. 24, line 35; Fig. 12; col. 26, lines 33-58];

receiving the control signals via a control unit (digital transceiver 13) coupled to the local loop and processing the control signals [Figs. 1-3; col. 9, lines 26-67];

selecting SLTE DSL amplification circuitry switch states in accordance with the processed control signals; selecting SLTE DSL amplification circuitry switch states in accordance with the processed sampled DSL signals to improve SLTE DSL amplification circuitry performance; uncoupling SLTE DSL amplification circuitry [Fig. 5] from the local loop in accordance with the processed control signals [Figs. 5-6; col. 11, line 19 to col. 12, line 45; col. 23, lines 18-39].

Mukherjee does not teach expressly sampling digital signals within DSL amplification circuitry.

Since Mukherjee teaches the system where sampling is required [Figs. 4, 5, 10, 16; col. 12, lines 23-67; col. 29, lines 13-59], it would have been obvious to a person of ordinary skill in the art to do sampling of DSL signals within the SLTE DSL amplification circuitry and processing the sampled DSL signals in order to reduce the memory requirement for processing.

Claim 45 is essentially similar to claim 44 and is rejected for the reasons stated above.

7. Claims 10, 26, 46-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukherjee as applied to claims 9 and 25 above.

Regarding claim 10, although Mukherjee teaches the system, wherein the

selection of one of the plurality of amplifying elements is based upon the particular characteristics of a subscriber loop [col. 19, lines 27-34], it would have been obvious to a person of ordinary skill in the art to use the loop length as one of the characteristics of the loop to select one of the amplifying elements to improve the implementation of impedance matching [Mukherjee: col. 19, lines 35-37].

Claim 26 is essentially similar to claim 10 and is rejected for the reasons stated above.

Claims 46-49 are rejected for the similar reasons stated above.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenoi et al [US 6,507,606 B2] in view of Gough et al [US 7,106,854 B2].

Regarding claim 1, Shenoi et al teach a system for improving transmission of DSL signals over a local loop shown in Fig. 5, the system comprising:

a loop extender (500) capacitively coupled to the local loop, the loop extender comprising: a first upstream filters (LPF) and amplifying element, and a first downstream filter (HPF) and amplifying element [Fig. 4-9; col. 7, line 31 to col. 9, line 56; col. 13, line 66 to col. Col. 15, line 50].

Shenoi et al do not teach expressly a plurality of upstream complex impedances coupled in parallel, a plurality of downstream complex impedances coupled in parallel, and switches for coupling the complex impedances to the filters.

Gough et al teach a DSL system having a selectable hybrid circuitry comprising a plurality of upstream complex impedances coupled in parallel (ZH1, ZH2, ZH3, ZH4), and a plurality of downstream complex impedances coupled in parallel (ZH1, ZH2, ZH3, ZH4) and a switch (104) capable of selecting binary lines (ASIC1 and ASIC2) to select those impedances to provide closest impedance match to the subscriber loops [Figs. 2-4; col. 4, lines 8-33; col. 2, line 51 to col. 4, line 7].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Gough et al with Sheno et al et al in order to provide selectable hybrid circuitry which closely matches the particular transmission line impedance on both sides of the loop extender [Gough et al; col. 2, lines 16-18]

Regarding claim 2, Gough et al further the system, wherein the first switch (104--ASIC1) is configured to select one of the plurality of complex upstream impedances to approximately match the local loop impedance in a first direction along the local loop [Fig. 4].

Regarding claim 3, Gough et al further the system, wherein the first direction is directed from the loop extender to a central office along the local loop (i.e. upstream driver (102)) [Fig. 4].

Regarding claim 4, Gough et al further the system, wherein the second switch (i.e. 104—ASIC2) is configured to select one of the plurality of complex downstream impedances to approximately match the local loop impedance in a second direction [Fig. 4].

Regarding claim 5, Gough et al further the system, wherein the second direction is directed from the loop extender to a customer premises along the local loop (i.e. downstream driver 100) [Fig. 4].

11. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hinman et al [US 6,977,958 B1] in view of Gough et al [US 7,106,854 B2].

Regarding claim 1, Hinman et al teach a system shown in Fig. 3, for

improving transmission of DSL signals over a local loop, the system comprising:

a loop extender (224) capacitively coupled to the local loop (214), the loop extender comprising:

a first upstream filter (314) and amplifying element (312); and
a first downstream filter (302) and amplifying element (304) [Fig. 3].

Although Hinman et al do suggest that it is desirable for the hybrids (322) and (324) to use complex impedances to potentially better match the impedance of the associated local loop (214) [col. 8, lines 24-54], they do not teach expressly a plurality of upstream complex impedances coupled in parallel, a plurality of downstream complex impedances coupled in parallel, and switches for coupling the complex impedances to the filters.

Gough et al teach a DSL system having a selectable hybrid circuitry comprising a plurality of upstream complex impedances coupled in parallel (ZH1, ZH2, ZH3, ZH4), and a plurality of downstream complex impedances coupled in parallel (ZH1, ZH2, ZH3, ZH4) and a switch (104) capable of selecting binary lines (ASIC1 and ASIC2) to select those

impedances to provide closest impedance match to the subscriber loops [Figs. 2-4; col. 4, lines 8-33; col. 2, line 51 to col. 4, line 7].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Gough et al with Hinman et al in order to provide selectable hybrid circuitry which closely matches the particular transmission line impedance [Gough et al; col. 2, lines 16-18]

Regarding claim 2, Gough et al further the system, wherein the first switch (104--ASIC1) is configured to select one of the plurality of complex upstream impedances to approximately match the local loop impedance in a first direction along the local loop [Fig. 4].

Regarding claim 3, Gough et al further the system, wherein the first direction is directed from the loop extender to a central office along the local loop (i.e. upstream driver (102)) [Fig. 4].

Regarding claim 4, Gough et al further the system, wherein the

second switch (i.e. 104—ASIC2) is configured to select one of the plurality of complex downstream impedances to approximately match the local loop impedance in a second direction [Fig. 4].

Regarding claim 5, Gough et al further the system, wherein the second direction is directed from the loop extender to a customer premises along the local loop (i.e. downstream driver 100) [Fig. 4].

Regarding claim 6, since Hinman et al teach the system, wherein the loop extender comprises a first upstream filter (314) and amplifying element (312); and a first downstream filter (302) and amplifying element (304) [Fig. 3], it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ any number of additional upstream filters and amplifying elements coupled in parallel to the first upstream filter and amplifying element; and downstream filters and amplifying elements coupled in parallel to the first downstream filter and amplifying element to further improve matching the impedance of an associated local loop and to provide both improved POTS band signal transmission and DSL service.

Allowable Subject Matter

12. Claims 31-43 are allowable.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 31 recites a system for improving transmission of digital subscriber line (DSL) signals over a local loop and the limitations for the following: a diagnostic and control unit coupled to the local loop for receiving and processing control signals from a central office, coupled to the bypass relay switches via a bypass relay for controlling the bypass relay switches, and coupled to the selectable line termination and equalization (SLTE) digital subscriber line (DSL) amplification circuitry via a plurality of switch control lines for controlling the SLTE DSL amplification circuitry.

The prior art does not teach this limitation.

Therefor, claim 31 is indicated allowable. Claims 32-43 being dependent from claim 31 are also indicated allowable.

13. Claims 11-17, 27-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

14. Applicant's argument filed on March 19, 2007 have been fully considered but they are not persuasive.

Applicant's argument—"The background section of Mukherjee discusses that in some prior art DSL systems, the operating range is limited beyond which repeaters are required. However, Mukherjee explicitly teaches the use of integrated circuits and techniques within the central office and remote DSL modems as solutions for addressing such problems (see Brief Summary of the invention Section of Mukherjee), rather than the use of repeater solutions" on page 11, lines 2-8.

Examiner's response—Examiner respectfully disagrees. In this context it may be noted that, since the use of integrated circuits and techniques of the loop extender of Mukherjee within the central office and remote DSL modems extend the operating range of DSL systems, the

Mukherjee's integrated circuits and techniques within the CO and the remote modems function as a DSL repeater. Hence, the Mukherjee's loop extender is equivalent to the use of repeater solutions.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Moschytz et al [US 6,208,732 B1] teach selecting impedances matching a loop impedance [Fig. 6; col. 5, lines 2-39].

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramnandan Singh whose telephone number is (571) 272-7529. The examiner can normally be reached on M-TH (8:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fan Tsang can be reached on (571) 272-7547. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ramnandan Singh
Examiner
Art Unit 2614



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